European Journal of Education Studies
ISSN: 2501 - 1111
ISSN-L: 2501 - 1111
Available on-line at: www.oapub.org/edu

doi: 10.5281/zenodo.292951 Volume 3 | Issue 3 | 2017

THE EFFECTS OF A SOCIAL LEARNING NETWORK ON STUDENTS' PERFORMANCES AND ATTITUDES

Gürhan Durak[i], Serkan Cankaya,
Eyup Yunkul, Gülcan Ozturk
Computer Education and Instructional Technology,
Balikesir University, Balikesir, Turkey

Abstract:
Despite the widespread use of Social Learning Networks (SLNs), there is little research on the effectiveness of these sites in related literature. Therefore, there is a need for studies investigating but use of SLNs in educational environments and their effects on learners' academic achievements. In this study, the purpose was to investigate the effects of use of Edmodo, a leading SLN site, on students' performances and attitudes towards online learning according to certain variables. In line with this purpose, using the pretest-posttest method, an experimental study with a control group was carried out with 79 learners taking the courses of Special Teaching Methods in the department of Computer Education and Instructional Technologies in the Education Faculty of a university in Turkey. In addition to face-to-face courses given to the experimental group students, various activities related to the course (group works, individual assignments, discussions) were carried out under the guidance of the course teacher via Edmodo. As for the control group students, they carried out the activities in class environment without using Edmodo. The results revealed that students who used Edmodo were more successful than those who did not. Based on this result, it could be stated that Edmodo had positive contributions to learners' academic achievements.

Keywords: social learning network, students' performances, students' attitudes

[i] Correspondence concerning this article should be addressed to Gürhan Durak, Department of Computer Education and Instructional Technologies, Balikesir University, Balikesir, Turkey. Contact: gurhandurak@balikesir.edu.tr, +905558084404

1. Introduction

Research on social Networking Sites (SNS), which draw millions of users' attention, shows that the most common reasons for the popularity of SNSs included such factors as communication (Boyd & Ellison, 2007; Cheung, Chiu, & Lee, 2011; Pempek, Yermolayeva, & Calvert, 2009; Quan-Haase & Young, 2010; Shier, 2005; Wodzicki, Schwämmlein, & Moskaliuk, 2012; Yu, Tian, Vogel, & Chi-Wai Kwok, 2010) and forming communities (Gunawardena et al., 2009; Shier, 2005) (Baruah, 2012; Boyd & Ellison, 2007; Cheung et al., 2011; Haytko & Parker, 2012; Lenhart & Madden, 2007; Mazman & Usluel, 2011; Yu et al., 2010). In this respect, considering the fact that countless number of students frequently participate in discussions and group activities in SNSs on voluntary basis, it is an undeniable fact that SNSs can be used as a potential educational tool (Bosch, 2009; Kabilan, Ahmad, & Abidin, 2010; Odabasi et al., 2012; Selwyn, 2009; Tonta, 2009).

When the features of SNSs are examined, it is seen that they support communication between individuals, forming a community, multimedia sharing and cooperation. These concepts overlap the propositions of the constructive learning theory and social-cognitive theory regarding the learning process (Kert & Kert, 2010). In addition, it is advised that the feeling of community for students who do not have the chance for face-to-face communication with teachers and other students in online environment should be developed (Brady, Holcomb, & Smith, 2010). Also, social presence is claimed to be an important component of teaching and learning (Garrison, Anderson, & Archer, 2000). Social presence, naturally supported by SNSs, could be said to be important for online learning environments as well (Anderson, 2005; Cheung et al., 2011; Cobb, 2009; Dawson, 2006). Besides all, in traditional education, some students do not participate sufficiently in class activities for various reasons. It is known that these students fail to establish healthy communication with their classmates as with their teachers (G. Miller, 2011). According to Miller (2011), virtual communities like SNSs could allow removing the problems experienced by such students. In related literature, there are several studies demonstrating that SNSs can used successfully by transforming them into an online learning environment (Al-Rahmi & Othman, 2013; Ekici & Kiyici, 2012; Forkosh-Baruch & Hershkovitz, 2012; Grosseck, Bran, & Tiru, 2011; Hung & Yuen, 2010; R. Junco, Heiberger, & Loken, 2011; Kabilan et al., 2010; Lawson, Kleinholz, & Bodle, 2011; Mazer, Murphy, & Simonds, 2007, 2009; Wodzicki et al., 2012). When the related literature is examined, it is seen that use of SNSs in education environments could have negative effects on the learning process as well (Karpinski & Duberstein, 2009; Rouis, Limayem, & Salehi-sangari, 2011; Wang, Chen, & Liang, 2011). In SNSs, the teacher and the student are in a position of friendship. It was found that

this situation could lead to role conflict and weaken the authority of the teacher (Warner & Esposito, 2009). In some studies, it was reported that students' average scores at school decrease as use of SNS increases (Cohen, 2011; Reynol Junco, 2012; Kirschner & Karpinski, 2010; O'Brien, 2011). Another study revealed that students do not consider SNSs to be useful for their academic processes; that they are unwilling to communicate with the instructor via SNSs; and that they do not believe in the need for the integration of SNSs into their educational processes (Cohen, 2011). In other words, it could be stated that educational use of SNSs, which are mostly favored by individuals to interact with friends, is regarded as an intervention to their private lives and that SNSs are thus not useful for their education processes.

SNSs lack such features as library, examination and assignment included in learning management systems like Moodle and Blackboard and thus do not basically serve an educational purpose. In addition, since SNSs are for general use, non-educational contexts may exist in such environments. For this reason, besides SNSs, other educational sites similar to SNSs in terms of functioning have appeared. These sites can be called Social Learning Networks (SLNs) (Al-kathiri, 2015; Balasubramanian, Jaykumar, & Fukey, 2014; Bicen, 2015; Trust, 2012). Examples of these sites include Edmodo, Ning, Elgg and ValuePulse. SLNs minimize safety and privacy concerns that could appear while using SNSs and allow teachers and students to use social network technologies for educational purposes (Brady et al., 2010).

Edmodo, the most popular SLN established in 2008, has reached more than 58 million users. Among the reasons for such a large spread of Edmodo throughout the world is the fact that it is totally free of charge; that membership is easy; that it provides multilanguage support; that besides its educational features, it has many of the features of an SNS; that it has a design similar to SNSs in terms of use; and that students, teachers and parents can easily register to the system. In addition to the capability SNSs to allow free sharing and to act as a source of news, Edmodo has such features found in LMSs as lesson planning tool, assignment, examination, questionnaire applications and teacher's account.

Another concept constituting the basis of the present study is the cooperative learning approach. This approach requires students to study in small groups for a common purpose (Wendt & Rockinson-Szapkiw, 2014). In this way, students are expected to learn by studying together and thus by helping one another (Jacobsen, Eggen, & Kauchak, 2002). According to the cooperative learning approach, students are expected to individuals, who can think, produce and share their productions with others (Tarim & Akdeniz, 2003). The benefits of cooperative learning have been reported in many studies related to education (Bye, Smith, & Rallis, 2009; Ding & Harskamp, 2011; R. L. Miller & Benz, 2008; Parveen & Batool, 2012; Yu et al., 2010).

These benefits include motivation, feelings of success, mutual interdependence (R. L. Miller & Benz, 2008), communication, level of satisfaction (Zhu & Chang, 2012), cognitive growth, and socio-emotional growth (Parveen & Batool, 2012; Wendt & Rockinson-Szapkiw, 2014). Thanks to collaboration, students can build meaningful knowledge by sharing ideas and obtaining feedback from peers as mentioned in the constructivist learning theory (Dewiyanti, Brand-Gruwel, Jochems, & Broers, 2007; Stump et al., 2011).

There are several studies demonstrating that effective and productive online cooperative learning environments contribute as much to students' success as face-to-face cooperative learning environments do (Erlandson, Nelson, & Savenye, 2010; R. L. Miller & Benz, 2008). Social networks provide students in different places with the opportunity of social and active learning and support cooperative learning (Ajjan & Hartshorne, 2008; Ozdamli & Uzunboylu, 2008). Johnson and Johnson (2004), in their study, reported that students' success increases when online learning environments are supported with cooperative learning. In addition, it was pointed out that these educational benefits of social networks were due to cooperative learning resulting from the sharings and interactions among students (Inaba & Mizoguchi, 2004; Mora-Soto, Sanchez, Medina, & Dominguez, 2009; Tinmaz, 2013). In a study conducted on the use of SLNs in education, it was found that university students believed reading their classmates' comments contributed to their learning (Wolf, Wolf, Frawley, Torres, & Wolf, 2012).

On the other hand, it was stated that text-based communication in online cooperative learning environments could be problematic and that these communication problems could increase misunderstandings and lack of higher-order thinking (Hewitt, 2003; Rovai & Jordan, 2004). In another experimental study with the pretest and posttest design which compared cooperative learning via Edmodo and cooperative learning in class revealed that face-to-face cooperative learning in class was more effective than cooperative learning via Edmodo that face-to-face cooperative learning students had fewer misconceptions regarding the course of science (Wendt & Rockinson-Szapkiw, 2014).

When related literature is examined, it is seen that there is little research demonstrating that Edmodo could be beneficial for examining teachers and students' views (Brady et al., 2010; Bynum, 2011; Cankaya et al., 2013; Enriquez, 2014; Kongchan, 2008; Sanders, 2012). There is no experimental research conducted to comparing the Influence of the cooperative environment in Edmodo on students' success with the face-to-face cooperative learning environment (Nee, 2014). The present study revealed that learners using Edmodo in biology course were more successful than those taking the same course on face-to-face basis.

There are also cases where Edmodo was used as a support to traditional courses which do not involve use of cooperative learning technique in class. However, as required by its nature, Edmodo somehow makes such courses cooperative. In this respect, it is necessary to compare class environments in which cooperative learning technique is not applied with those in which Edmodo is used as a support. From this perspective, it could be stated that there is a need for experimental research investigating effects of use of Edmodo as a cooperative learning environment on students' performances and attitudes. For this reason, the present study was conducted to examine the effects of use of Edmodo within the scope of the course of Special Teaching Methods-I (STM-I) on the participants' academic performances and on their attitudes towards online learning with respect to certain variables. In line with the purpose of the present study, which is thought to have important contributions to the related literature in Turkey, the following research questions were directed:

1. Is there any difference between the achievement scores of the learners using Edmodo in the course of STM-I and those of the learners taking the same course with the traditional teaching method?
2. Is there any difference between the attitudes of learners using Edmodo in the course of STM-I towards online learning and those of learners taking the same course with traditional teaching method?
3. Is there a relationship between the experimental and control group learners' attitudes towards online learning and their achievement scores in the course of STM-I?
4. Is there any influence such variables as Cumulative Grade Point Average (CGPA) gender, type of school, frequency of use of the Internet and social networks and online learning experience on the learners' achievement scores in the course of STM-I?

2. Method

2.1 Research Model

The present study, which was conducted with the experimental research design, investigated influence of Edmodo both on learners' achievement scores in the course of STM-I and on their attitudes towards online learning. In addition, the study also examined the relationships between the independent variables and the dependent variables.

The independent variables used in the study were cumulative grade point average (CGPA) online learning experience, type of school, gender and the frequency of

use of the Internet and social networks. As for the dependent variables, they were achievement score in the course of STM-I and attitudes towards online learning.

2.2 Participants

The participants of the study were 79 3rd-grade learners attending the department of Computer Education and Instructional Technologies in Necatibey Education Faculty of Balıkesir University. The experimental and control groups were formed with the convenience sampling method. Accordingly, the learners taking their courses in daytime constituted the experimental group, and those taking night courses constituted the control group.

2.3 Data Collection Tools

In the study, a multiple choice achievement test prepared by the course teacher for the course of STM-I was applied as the data collection tool. For content validity, all the questions in this multiple choice achievement test were prepared considering the subjects taught within the scope of the related course. In this respect, all the behaviors intended to be measured were included in the data collection tool. The questions were examined by field experts and found appropriate the course content. Following this, the comprehensibility of the statements found in the questions was checked. For the distribution of the questions, special attention was paid to the fact that there would be only one question regarding a subject; that the statement used in a question would not provide a clue for the answer to another question; and that the correct choices would be balanced. Also, the measurement tool could be said to be reliable as the pretest Cronbach-Alpha coefficient was found to meet the value of .80.

Another data collection tool used in the study was "Online Learning Attitude Scale" made up of two sub-factors with 25 items. These sub-factors were resistance and adoption. This scale was developed by Erdoğan, Bayram and Deniz (2007), and the researchers were asked for their written consents to use the scale in the present study. The Cronbach Alpha internal reliability coefficient for the scale was found by Erdoğan and colleagues as 0,917 (2007), by Özcan (2009) as 0,931 and by Durak (2013) as 0,923 in previous studies.

2.4 Data Analysis

In the study, for the comparison of the groups' achievement scores and their attitudes towards online learning, tests for mixed measures and normality were applied to see whether there was a normal distribution or not (Kolmogorov-Smirnov, Shapiro-Wilk). In addition, for the homogeneity of the variances, Levene test was used. Besides these, for the purpose of determining the relationship between the students' achievement

scores for the course of STM-I and their attitude scores regarding online learning, correlation analysis was used, and to find the extent to which the independent variables in the study influenced the dependent variables, multiple regression analyses were conducted. For the analysis of the data, SPSS 21 package software was used.

2.5 Application Process

The content of the course of Special Education Methods-I given in the department of Computer Education and Instructional Technologies included such subjects as examining the Elementary School Computer Education Curriculum (Ministry of National Education, 2006) and the related coursebooks, instructional methods and techniques, mind mapping, instructional materials like worksheets, examining the measurement and evaluation methods and techniques and applying them to the subjects in the curriculum, and explaining how to make a lesson plan for teaching the subjects in the curriculum. As appropriate to this content, the students were given out-of-class assignments. These assignments included preparing a report about the basic features of the curriculum, preparing instructional activities with inventions for the subjects in the curriculum, preparing questions appropriate to the gradual classification of cognitive behaviors for each step selected from the curriculum (Taşpınar, 2005), preparing a mind map for each step in the curriculum, preparing a worksheet regarding a related subject in the curriculum, preparing a structured grid and branched trees for the related subjects in the curriculum, and preparing a lesson plan for each subject selected from the curriculum.

In the study, 39 students (experimental group) taking the course of STM- in the Spring Term of the academic year of I 2013-2014 were asked to sign up Edmodo. The students were divided into a total of five groups based on their own preference via Edmodo: four groups each including eight members and one group including seven members. The assignments mentioned above were given to the students on weekly basis, and the students were asked to do one assignment individually for each week and to share it in their own groups. The students were asked for their comments regarding the assignments shared in their own groups. The course teacher examined the sharings and made comments when necessary. The sharings found appropriate were also projected in class and presented to all the students, and related discussions were done as a whole class.

The students who were not included in the experimental group constituted the control group. These students were taught the same subjects in class as well. They were also given the same assignments and were asked to do them individually in to hand in these assignments to the teacher.

3. Findings

This part of the study first presents the frequencies of the learners' use of the Internet and social networks and the related percentages and frequencies regarding the social networking sites they used (Table 1). Following this, the findings in relation to the sub-problems in the study are given under related headings.

Table 1: Findings Regarding Internet and Social Network Use

Internet Use Frequency		**Frequency (f)**	**Percentage (%)**
Less than an hour a day		6	8
Between 1-3 hours a day		27	34
More than 3 hours a day		46	58
Social Network Use Frequency			
Less than an hour a day		20	25
Between 1-3 hours a day		40	51
More than 3 hours a day		19	24
Social Networks Used			
Facebook	76	96	
WhatsApp	76	96	
YouTube	71	90	
Google+	56	71	
Instagram	46	58	
Foursquare	26	33	
LinkedIn	17	22	
Flicker	4	5	

When Table 1 is examined, it is seen that a great majority of the students (58%) used the Internet for more than three hours a day. It was also found that almost half of the learners used social networks for 1 to 3 hours a day and that 24% of them used social networks for more than three hours a day. When the students' preferences of social networks were examined, it was seen that they favored Facebook and WhatsApp most, which were followed by YouTube, Google+ and Instagram.

3.1 Findings related to the first sub-problem

The first sub-problem in the study was the question of "*Is there any difference between the achievement scores of the students using Edmodo in the course of STM-I and those of the students taking the same course with traditional methods?"*. In order to test this sub-problem, the experimental and control groups took a pretest before the experimental process and a posttest at the end of the process. Table 2 presents the pretest-posttest mean scores and the related standard deviations for both groups of students.

Table 2: Achievement Test Mean Scores and Standard Deviations

Group	Pretest			Posttest		
	N	X	S	N	X	S
Experimental Group	39	16.74	3.65	39	21.92	3.39
Control Group	40	15.25	4.95	40	16.48	5.52

As can be seen in Table 2, there was an increase in the mean scores of both groups of students. Before comparing the pretest and posttest scores between the two groups, the groups' normal distribution values were examined with Kolmogorov-Smirnov test. The p value was found to be higher than .05 for the pre-attitude and post-attitude scores. Based on this result, it could be stated that both groups demonstrated a normal distribution. For the purpose of determining whether the change presented in Table 2 was statistically significant or not, two–way analysis of variance was conducted. The results can be seen in Table 3 below.

Table 3: ANOVA Results for the Pretest-Posttest Scores of the Experimental and Control Groups

Source of Variance	KT	Sd	KO	F	P
Between Groups	2582,08	78			
Group (Individual/Group)	475,76	1	475,76	17,4	.000
Error	2106,32	77	27,36		
Within Groups	1542,74	79			
Measurement (Pretest-Posttest)	404,99	1	404,99	31,71	.000
Group*Measurement	154,4	1	154,4	12,1	.000*
Error	983,35	77	12,78		
Total	4124,82	157			

*p<.01

According to Table 3, the achievement test scores of the experimental and control groups demonstrated a significant difference before and after the experimental process. In other words, the common effects (group*measurement) of conducting repeated measurements (pretest and posttest) and being in a different group (experimental and control groups) on the students' achievement scores were found to cause a significant difference (F(1-77)= 12,1; p<.01).

Two-way ANOVA was repeated taking the CGPA value as covariate. According to the test results, a significant difference was found between the groups' achievement scores (p<.01).

3.2 Findings related to the second sub-problem

The second sub-problem in the study was the question of "*Is there a difference between the attitudes of students using Edmodo in their course and those of students taking the same course with traditional method towards online learning?"*. In order to test this sub-problem, the experimental and control groups took the pre-attitude test before the experimental process and the post-attitude test following the experimental process. Table 4 presents the preattitude-postattitude mean scores and the related standard deviations for both groups of students.

Table 4: Total Attitude Scores and Standard Deviations

Group	Pre-Attitude			Post-Attitude		
	N	X	S	N	X	S
Experimental Group	39	81.21	8.03	39	83.87	8.22
Control Group	40	83.58	6.67	40	82.40	11.59

According to Table 4, there was an increase in the attitude scores of the experimental group students, while a decrease was observed in those of the control group students. Before comparing the preattitude and postattitude scores between the groups, the groups' normal distribution values were examined with Kolmogorov-Smirnov test. The p value was found to be higher than .05 for the preattitude and postattitude scores of the two groups. Therefore, it could be stated that both groups demonstrated a normal distribution. For the purpose of determining whether the change presented in Table 4 was statistically significant or not, two–way analysis of variance was conducted. The results can be seen in Table 5 below.

Table 5: ANOVA Results for the Preattitude-Postattitude Scores of the Experimental and Control Groups

Source of Variance	KT	sd	KO	F	P
Between Groups	26208,725	78			
Group(Individual/Group)	29,555	1	29,555	34,94	.000
Error	26179,17	77	339,99		
Within Groups		79			
Measurement(Preattitude-Postattitude)	206,89	1	206,89	2,49	.119
Group*Measurement	1,37	1	1,37	0,016	.898*
Error	63,99	77	83,11		
Total	272,25	157			

*p>.01

According to Table 5, no significant difference was found in relation to the attitude test scores of the experimental and control groups before and after the experimental process. In other words, the common effects (group*measurement) of conducting repeated measurements (pretest and posttest) and being in a different group (experimental and control groups) on the attitude scores did not cause a significant difference (F(1-77)= 1,37; p>.01).

3.4 Findings related to the third sub-problem

The third sub-problem in the study was the question of "*Is there a relationship between the achievement scores of the experimental group and control group students regarding the course of STM-I and their attitudes towards online learning?".* In order to determine the level of relationship between the students' pretest scores and their attitude scores regarding online learning, correlation analysis was conducted. Depending on the results of this analysis, it could be stated that there was quite a low level of relationship between the students' pretest achievement scores and their preattitude scores (r=.08). A similar relationship was also observed between the students' posttest scores and their postattitude scores regarding online learning (r=.01).

3.5 Findings regarding the fourth sub-problem

The fourth sub-problem in the study was the question of "*Do the variables of gender, school type, frequency of social network use and online learning experience on students' achievement scores regarding the course of STM I?".*

Table 6: t-Test results for the experimental group students' posttest scores with respect to certain variables

Variable		N	X	S	sd	t	p
Online Learning Experience	Yes	21	22.57	3.4	37	1.30	.201
	No	18	21.17	3.31			
School Type	Vocational High School	34	22.59	2.60	37	-3.69	.001*
	Other	5	17.40	4.93			
Gender	Female	22	22.68	2.34	37	-1.62	.113
	Male	17	20.94	4.28			

*p<.01

According to Table 6, no significant difference was found between the achievement scores of the experimental group students who previously had online learning experience (X=22.57) and those of the students who did not (X=21.17) (p>.01). When the students were examined with respect to their school type, a significant difference was found between the achievement scores of the students who graduated from a vocational

school (X=22.59) and those of the students who graduated from other types of schools (X=17.40) in favor of the former (p<.01). Lastly, the students' achievement scores were compared in terms of the variable of gender, and it was found that gender did not have any significant influence on the students' achievement scores (p>.01).

Table 7: t-Test results for the control group students' posttest scores with respect to certain variables

Variable		N	X	S	Sd	t	p
Online Learning Experience	Yes	29	16.10	5.43	38	-.69	.50
	No	11	17.45	5.90			
School Type	Vocational High School	25	17.16	5.61	38	-1.01	.318
	Other	15	15.33	5.36			
Gender	Female	15	17.33	7.54	38	-.757	.454
	Male	25	15.96	3.96			

According to Table 7, no significant difference was found between the achievement scores of the control group students who had online learning experience (X=16.10) and those of the students who did not (X=17.45) (p>.01). When the students were examined with respect to their school type, it was found that there was no significant difference between the achievement scores of the students who graduated from a vocational school (X=17.16) and those of the students who graduated from other types of schools (X=15.33) (p>.01). Lastly, the students' achievement scores were compared in terms of the variable of gender. It was found that the female students' achievement mean score was 17.33 and that the male students' achievement mean score was 15.96. Thus, gender did not have any significant influence on the students' achievement scores (p>.01).

In order to examine the relationship of the students' achievement scores with the frequency of their Internet use and with their levels of social network use, one-way ANOVA was applied. The results did not reveal any significant difference between the students' achievement scores and the frequencies of the students' Internet use and social network use in both groups (p>.01).

4. Conclusion, Discussion and Suggestions

In this experimental study, the students taking the course of STM-I were divided into groups: experimental group and control group. The experimental group students used Edmodo as a support to face-to-face courses, while the control group students did not use it. The achievements of these two groups of students in the related course and their attitudes towards online learning were tested before and after the experimental process, and the results obtained were compared. In addition, the students' achievement scores

were examined with respect to such variables as attitudes towards online learning, gender, academic mean score, Internet and social network use, school type and online learning experience.

The students found in the experimental group formed within the scope of the course of STM-I actively used Edmodo. These students shared in their groups, participated in discussions and did assignments via Edmodo. The results of the pretest applied at the beginning of the academic term did not reveal any significant difference between the experimental and control groups. According to the posttest results of the experimental group students who took the course of STM-I via Edmodo throughout the academic term, they were more successful than the control group students. Depending on this result, it could be stated that Edmodo made positive contributions to learners' success. Similarly, in one study carried out by Nee (2014), the researcher reported that a course taught via Edmodo contributed to students' success more than traditional methods did. However, on the contrary to these result, Wendt & Rockinson-Szapkiw (2014), in their experimental study misconceptions in the course of Science, found that face-to-face learners had fewer misconceptions than those taking their course via Edmodo. This result could be explained with the fact that the course taught included experimental applications; that learners cannot thus pay enough attention to experiments via an asynchronous platform; and that a good-quality instructional environment cannot eventually be created.

In the study, the influence of the students' past achievements (academic mean score) on their achievement scores in the course of STM-I was examined. In this respect, the variable of academic mean score was kept constant, and it was found that the experimental process applied did not have any influence on the students' achievement scores. In other words, of the two students with the same academic mean score, the one involved in the experimental process had a higher score in the achievement test. This result is consistent with other experimental research results examining academic mean score in related literature (Durak, 2014; Yunkul, 2014).

When the frequencies of the students' Internet and social network use were examined, it was seen that almost all of them used the Internet and especially social networks quite intensively. This result could be due to the fact that the participants were students in the department of Computer Education and Instructional Technologies. Among the social networks most favored by the students were Facebook and WhatsApp, which were followed by twitter, YouTube, Google+ and Instagram. These findings are parallel to those obtained in other studies carried out by Ayres (2012) and Miah, Omar &Allison-Golding (2012).

In the present study, besides the comparison of the academic performance, the students' attitudes towards online learning were examined as well. According to the

preattitude and postattitude scores of the students, no significant difference was found between the two groups of students. This result could be due to the fact that the students were from the department of Computer Education and Instructional Technologies and that they were thus familiar with online learning environments. Besides the lack of a significant difference between the attitude scores, the low level of relationship between the attitude scores and achievement scores could be said to demonstrate consistency between the findings obtained in the study.

Lastly, in the study, the influence of the variables of gender, school type, social network use frequency and online learning experience on the experimental group students' achievement scores in the course of STM-I was examined. It was found that the variable of gender did not have any influence on the students' achievement scores. In other studies which examined the influence of gender on students' achievement and which did not reveal any significant difference (Fettahlioğlu, Güven, Aka, Çibik, & Ydoğdu, 2011; Kiliç & Karadeniz, 2004; Yunkul, 2014), similar results were obtained. Also, in the study, when the variable of school type was taken into account, the achievement scores of the students who graduated from vocational high schools were higher than those of the students who graduated from other types of schools. This result could be explained with the fact that the students took more computer courses during their education at vocational schools. This result is also supported with the findings obtained in other similar experimental studies (Durak, 2009, 2014). Lastly, in the study, the influence of online learning experiences on students' achievement scores was examined, and it was found that this variable did not have any influence on the students' achievement scores. This result could be explained with the fact that Edmodo allows easy use (Durak, Cankaya, & Yunkul, 2014); that it has a design similar to that of Facebook (Cankaya et al., 2013); and that there is no need for online learning experience to make effective use of the platform.

In line with the results obtained in the present study, the following suggestions could be put forward for trainers, researchers and for institutions.

1. Instructors teaching at all education levels from elementary school to higher education are suggested to use Edmodo in their courses. In this way, lessons will be more active, more interactive and more controllable.
2. In this experimental study, traditional education and Edmodo-aided education were compared in terms of students' academic achievement. In addition, other researchers could experimentally compare a course taught only via Edmodo with the one taught with traditional method.
3. Researchers could develop an attitude scale regarding the use of SLN in education and conduct a large-scale application.

4. Comparative studies could be conducted by applying Edmodo to different disciplines. In this way, the areas to which it is more appropriate could be investigated.

References

1. Ajjan, H., & Hartshorne, R. (2008). Investigating faculty decisions to adopt Web 2.0 technologies: Theory and empirical tests. *The Internet and Higher Education*, *11*(2), 71–80. doi:10.1016/j.iheduc.2008.05.002
2. Al-Rahmi, W. M., & Othman, M. S. (2013). The impact of social media use on academic performance among university students: A pilot study. *Journal Of Information Systems Research And Innovation*, *4*(2), 1–10.
3. Anderson, T. (2005). Distance learning – Social software's killer ap? In *Conference of the Open and Distance Learning Association of Australia (ODLAA)* (pp. 1–12). Adelaide, South Australia: University of South Australia.
4. Baruah, T. D. (2012). Effectiveness of Social Media as a tool of communication and its potential for technology enabled connections : A micro-level study. *International Journal of Scientific and Research Publications*, *2*(5), 1–10.
5. Bosch, T. E. (2009). Using online social networking for teaching and learning: Facebook use at the University of Cape Town. *South African Journal for Communication Theory and Research*, *35*(2), 185–200.
6. Boyd, D. M., & Ellison, N. B. (2007). Social network sites: Definition, history, and scholarship. *Journal of Computer-Mediated Communication*, *13*(1), 210–230. doi:10.1111/j.1083-6101.2007.00393.x
7. Brady, K. P., Holcomb, L. B., & Smith, B. V. (2010). The use of alternative social networking sites in higher educational settings : A case study of the e-learning benefits of ning in education. *Journal of Interactive Online Learning*, *9*(2), 151–170.
8. Bye, L., Smith, S., & Rallis, H. M. (2009). Reflection Using an Online Discussion Forum: Impact on Student Learning and Satisfaction. *Social Work Education*, *28*(8), 841–855. doi:10.1080/02615470802641322
9. Bynum, S. L. (2011). *Utilizing social media to increase student engagement: A study of Kern County public schools*. (Unpublished master's thesis). California State University Department of Public Policy and Administration, Bakersfield.
10. Cankaya, S., Durak, G., & Yunkul, E. (2013). Using educational social networking sites in higher education: edmodo through the lenses of undergraduate students. *European Journal of Education Technology*, *1*(1), 3–23.

11. Cheung, C. M. K., Chiu, P.-Y., & Lee, M. K. O. (2011). Online social networks: Why do students use Facebook? *Computers in Human Behavior*, *27*(4), 1337–1343. doi:10.1016/j.chb.2010.07.028
12. Cobb, S. C. (2009). Social presence and online learning : A current view from a research perspective. *Journal of Interactive Online Learning*, *8*(3), 241–254.
13. Cohen, A. (2011). *Higher education students' perspectives of the relevance of the online social networking site Facebook to education*. (Unpublished doctoral dissertation). Walden University College of Social and Behavioral Sciences.
14. Dawson, S. (2006). A study of the relationship between student communication interaction and sense of community. *The Internet and Higher Education*, *9*(3), 153–162. doi:10.1016/j.iheduc.2006.06.007
15. Dewiyanti, S., Brand-Gruwel, S., Jochems, W., & Broers, N. J. (2007). Students' experiences with collaborative learning in asynchronous Computer-Supported Collaborative Learning environments. *Computers in Human Behavior*, *23*(1), 496–514. doi:10.1016/j.chb.2004.10.021
16. Ding, N., & Harskamp, E. G. (2011). Collaboration and Peer Tutoring in Chemistry Laboratory Education. *International Journal of Science Education*, *33*(6), 839–863. doi:10.1080/09500693.2010.498842
17. Durak, G. (2009). *Algoritma Konusunda Geliştirilen "Programlama Mantığı Öğretici-P.M.Ö" Yazılımının Öğrenci Başarısına Etkisi*. *Journal of Chemical Information and Modeling*. Balıkesir University.
18. Durak, G. (2013). *Programlama Dillerinin Cevrimici Ogretimi: Ogrenenlerin Tutumlarinin, Memnuniyetlerinin ve Akademik Basarilarinin Incelenmesi*. (Unpublished doctoral dissertation). Anadolu Universitesi Sosyal Bilimler Enstitusu,.
19. Durak, G. (2014). The effects of a distance education programming language course on student performance. *Journal of Theory and Practice in Education*, *10*(1), 202–219.
20. Durak, G., Cankaya, S., & Yunkul, E. (2014). Egitimde egitsel sosyal ag sitelerinin kullanimi: edmodo ornegi. *Dumlupınar University Journal of Social Sciences*, *41*, 309–316. doi:10.1007/s13398-014-0173-7.2
21. Ekici, M., & Kiyici, M. (2012). Sosyal aglarin egitim baglaminda kullanimi. *Usak Universitesi Sosyal Bilimler Dergisi*, *5*(2), 156–167.
22. Enriquez, M. A. S. (2014). Students' Perceptions on the Effectiveness of the Use of Edmodo as a Supplementary Tool for Learning. *DLSU Research Congress*, 1–6.
23. Erlandson, B. E., Nelson, B. C., & Savenye, W. C. (2010). Collaboration modality, cognitive load, and science inquiry learning in virtual inquiry environments.

Educational Technology Research and Development, *58*(6), 693–710. doi:10.1007/s11423-010-9152-7

24. Fettahlioğlu, P., Güven, E., Aka, E. Ġ., Çibik, A. S., & Ydoğdu, M. A. (2011). The Effect of Science Teacher Candidates' Self- Efficacy towards Science Education on Academic Achievement. *Ahi Evran Üniversitesi Eğitim Fakültesi Dergisi*, *12*(3), 159–175.
25. Forkosh-Baruch, A., & Hershkovitz, A. (2012). A case study of Israeli higher-education institutes sharing scholarly information with the community via social networks. *The Internet and Higher Education*, *15*(1), 58–68. doi:10.1016/j.iheduc.2011.08.003
26. Garrison, D. R., Anderson, T., & Archer, W. (2000). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education*, *2*(3), 87–105.
27. Grosseck, G., Bran, R., & Tiru, L. (2011). Dear teacher, what should I write on my wall? A case study on academic uses of Facebook. *Procedia - Social and Behavioral Sciences*, *15*(2011), 1425–1430. doi:10.1016/j.sbspro.2011.03.306
28. Gunawardena, C. N., Hermans, M. B., Sanchez, D., Richmond, C., Bohley, M., & Tuttle, R. (2009). A theoretical framework for building online communities of practice with social networking tools. *Educational Media International*, *46*(1), 3–16. Retrieved from http://onlinelibrary.wiley.com/doi/10.1002/cbdv.200490137/abstract
29. Haytko, D. L., & Parker, R. S. (2012). Social networking tools in a university setting : a student's perspective. *Journal of Instructional Pedagogies*, *9*, 1–9.
30. Hewitt, J. (2003). How Habitual Online Practices Affect the Development of Asynchronous Discussion Threads. *Journal of Educational Computing Research*, *28*(1), 31–45. doi:10.2190/PMG8-A05J-CUH1-DK14
31. Hung, H.-T., & Yuen, S. C.-Y. (2010). Educational use of social networking technology in higher education. *Teaching in Higher Education*, *15*(6), 703–714. doi:10.1080/13562517.2010.507307
32. Inaba, A., & Mizoguchi, R. (2004). Learners Role and Predictible Benefits in Collaborative Learning. In *Proceedings of International Conference on Intellegent Tutoring Systems* (pp. 285–294). Alagoas.
33. Jacobsen, D. A., Eggen, P., & Kauchak, D. (2002). *Methods for teaching* (6. ed.). Upper Saddle River, NJ: Merrill-Prentice Hall.
34. Johnson, D., & Johnson, R. (2004). Cooperation and the use of technology. In D. Jonassen (Ed.), *Handbook of research on educational communications and technology* (2nd ed., pp. 785–812). Erlbaum.: Mahwah. Retrieved from http://books.google.com/books?hl=en&lr=&id=GgCPAgAAQBAJ&oi=fnd&pg=P

A401&dq=Cooperation+and+the+use+of+technology&ots=A71ZGNQ3p9&sig=ovGabn-bVDpFyow24eKvLVi0ktA

35. Junco, R. (2012). The relationship between frequency of Facebook use, participation in Facebook activities, and student engagement. *Computers & Education*, *58*(1), 162–171. doi:10.1016/j.compedu.2011.08.004
36. Junco, R., Heiberger, G., & Loken, E. (2011). The effect of Twitter on college student engagement and grades. *Journal of Computer Assisted Learning*, *27*(2), 119–132. doi:10.1111/j.1365-2729.2010.00387.x
37. Kabilan, M. K., Ahmad, N., & Abidin, M. J. Z. (2010). Facebook: An online environment for learning of English in institutions of higher education? *The Internet and Higher Education*, *13*(4), 179–187. doi:10.1016/j.iheduc.2010.07.003
38. Karpinski, A. C., & Duberstein, A. (2009). A description of Facebook use and academic performance among undergraduate and graduate students. In *American Educational Research Association Annual Meeting*. San Diego, California.
39. Kert, S. B., & Kert, A. (2010). The usage potential of social network sites for educational purposes. *International Online Journal of Educational Sciences*, *2*(2), 486–507.
40. Kiliç, E., & Karadeniz, Ş. (2004). Cinsiyet ve Öğrenme Stilinin Gezinme Stratejisi ve Başarıya Etkisi The Effects of Gender and Learning Style on Navigation Strategy and Achievement. *Gazi Eğitim Fakültesi Dergisi*, *3*, 129–146.
41. Kirschner, P. a., & Karpinski, A. C. (2010). Facebook® and academic performance. *Computers in Human Behavior*, *26*(6), 1237–1245. doi:10.1016/j.chb.2010.03.024
42. Kongchan, C. (2008). How a non-digital-native teacher makes use of edmodo. In *5th Intenational Conference ICT for Language Learning*. Florence.
43. Lawson, T. J., Kleinholz, S. A., & Bodle, J. H. (2011). Using Facebook to connect alumni, current students, and faculty: A how-to guide. *Teaching of Psychology*, *38*(4), 265–268. doi:10.1177/0098628311421327
44. Lenhart, A., & Madden, M. (2007). *Teens, Privacy & Online Social Networks How teens manage their online identities and personal information in the age of Findings*. Washington, D.C.: Pew Inrernet & American Life Project. Retrieved from http://www.pewinternet.org/~/media//Files/Reports/2007/PIP_Teens_Privacy_SNS_Report_Final.pdf.pdf
45. Mazer, J. P., Murphy, R. E., & Simonds, C. J. (2007). I'll see you on "Facebook": The effects of computer-mediated teacher self-disclosure on student motivation, affective learning, and classroom climate. *Communication Education*, *56*(1), 1–17. doi:10.1080/03634520601009710

46. Mazer, J. P., Murphy, R. E., & Simonds, C. J. (2009). The effects of teacher self-disclosure via Facebook on teacher credibility. *Learning, Media and Technology*, *34*(2), 175–183. doi:10.1080/17439880902923655
47. Mazman, S. G., & Usluel, Y. K. (2011). Gender differences in using social networks. *The Turkish Online Journal of Educational Technology*, *10*(2), 133–139.
48. Miller, G. (2011). Social scientists wade into the tweet stream. *Science*, *333*(6051), 1814–1815.
49. Miller, R. L., & Benz, J. J. (2008). Techniques for Encouraging Peer Collaboration: Online Threaded Discussion or Fishbowl Interaction. *Journal of Instructional Psychology*, *35*(1), 87–93. Retrieved from https://login.proxy.library.msstate.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=pbh&AN=31780834&login.asp&site=ehost-live
50. Milli Eğitim Bakanlığı [MEB]. (2006). *İlköğretim Bilgisayar Dersi (1-8 Sınıflar) Programı*. Ankara: MEB Yayınları.
51. Mora-Soto, A., Sanchez, M.-I., Medina, S. F., & Dominguez, A. A. (2009). Collaborative learning experiences using social networks. Retrieved February 15, 2014, from http://library.iated.org/view/MORASOTO2009COL
52. Nee, C. K. (2014). The Effect of Educational Networking on Students' Performance in Biology. *International Journal on Integrating Technology in Education*, *3*(1), 21–41. doi:10.5121/ijite.2014.3102
53. O'Brien, S. J. (2011). *Facebook and other Internet use and the academic performance of college students*. (Unpublished doctoral dissertation). The Temple University Graduate School.
54. Odabasi, H. F., Misirli, O., Gunuc, S., Timar, Z. S., Ersoy, M., Som, S., … Erol, O. (2012). Egitim icin yeni bir ortam: Twitter. *Anadolu Journal of Educational Sciences International*, *2*(1), 89–103.
55. Ozdamli, F., & Uzunboylu, H. (2008). Ogretmen adaylarinin teknoloji destekli isbirlikli ogrenme ortamina yonelik. *Cypriot Journal Of Educational Sciences*, *5*, 28–36.
56. Ozkan, B., & McKenzie, B. (2008). Social networking tools for teacher education. In *Society for Information Technology & Teacher Education International Conference* (pp. 2772–2776). Chesapeake, VA: AACE.
57. Parveen, Q., & Batool, S. (2012). Effect of cooperative learning on achievement of students in general science at secondary level. *International Education Studies*, *5*(2), 154–158. doi:10.5539/ies.v5n2p154
58. Pempek, T. A., Yermolayeva, Y. A., & Calvert, S. L. (2009). College students' social networking experiences on Facebook. *Journal of Applied Developmental Psychology*, *30*(3), 227–238. doi:10.1016/j.appdev.2008.12.010

59. Quan-Haase, a., & Young, a. L. (2010). Uses and gratifications of social media: A comparison of Facebook and instant messaging. *Bulletin of Science, Technology & Society*, *30*(5), 350–361. doi:10.1177/0270467610380009
60. Rouis, S., Limayem, M., & Salehi-sangari, E. (2011). Impact of Facebook usage on students' academic achievement: roles of self-regulation and trust. *Electronic Journal of Research in Educational Psychology*, *9*(3), 961–994.
61. Rovai, A. P., & Jordan, H. M. (2004). Blended Learning and Sense of Community: A comparative analysis with traditional and fully online graduate courses. *International Review of Research in Open and Distance Learning*, *5*(2), 1–13.
62. Sanders, K. S. (2012). *An examination of the academic networking site Edmodo on student engagement and responsible learning*. (Unpublished doctoral dissertation). University of South Carolina College of Education.
63. Selwyn, N. (2009). Faceworking: exploring students' education-related use of Facebook. *Learning, Media and Technology*, *34*(2), 157–174. doi:10.1080/17439880902923622
64. Shier, M. T. (2005). The way technology changes how we do what we do. *New Directions for Student Services*, *2005*(112), 77–87. doi:10.1002/ss.186
65. Smith, B. V. (2009). *Use of online educational social networking in a school environment*. (Unpublished master's thesis). North Carolina State University Graduate Faculty, Raleigh, North Carolina.
66. Stump, G. S., Hilpert, J. C., Husman, J., Chung, W., Kim, W., & Education, E. (2011). Collaborative Learning in Engineering Students: Gender and Achievement. *Journal of Engineering Education*, *100*(3), 475–497. doi:10.1002/j.2168-9830.2011.tb00023.x
67. Tarim, K., & Akdeniz, F. (2003). Illkogretïm matematïk derslerïnde kubasik ogrenme yontemïnïn kulanilmasi. *Hacettepe Universitesi Egitim Fakultesi Dergisi*, *24*, 215–223.
68. Taşpınar, M. (2005). *Kuramdan Uygulamaya Öğretim Yöntemleri*. Elazığ: Üniversite Kitapevi.
69. Tinmaz, H. (2013). Sosyal ag web siteleri ve sosyal aglarin egitimde kullanimi. In K. Cagiltay & Y. Goktas (Eds.), *Ogretim Teknolojilerinin Temelleri: Teoriler, Arastirmalar, Egilimler* (pp. 615–630). Ankara: Pegem Akademi.
70. Tonta, Y. (2009). Dijital yerliler, sosyal aglar ve kutuphanelerin gelecegi. *Turk Kutuphaneciligi*, *23*(4), 742–768.
71. Wang, Q., Chen, W., & Liang, Y. (2011). *The effects of social media on college students*. Johnson & Wales University ScholarsArchive@JWU MBA Student Scholarship. Retrieved from http://scholarsarchive.jwu.edu/mba_student/5/

72. Warner, B., & Esposito, J. (2009). What's not in the syllabus: Faculty transformation, role modeling and role conflict in immersion service-learning courses. *International Journal of Teaching and Learning in Higher Education*, *20*(3), 510–517.
73. Wendt, J. L., & Rockinson-Szapkiw, A. (2014). The effect of online collaboration on middle school student science misconceptions as an aspect of science literacy. *Journal of Research in Science Teaching*, *51*(9), 1103–1118. doi:10.1002/tea.21169
74. Wodzicki, K., Schwämmlein, E., & Moskaliuk, J. (2012). "Actually, I wanted to learn": Study-related knowledge exchange on social networking sites. *The Internet and Higher Education*, *15*(1), 9–14. doi:10.1016/j.iheduc.2011.05.008
75. Wolf, M. M., Wolf, M., Frawley, T., Torres, A., & Wolf, S. (2012). Using social media to enhance learning through collaboration in higher education: a case study. In *Agricultural Economics Association 2012 Annual Meeting*. Seattle, Washington.
76. Yu, A. Y., Tian, S. W., Vogel, D., & Chi-Wai Kwok, R. (2010). Can learning be virtually boosted? An investigation of online social networking impacts. *Computers & Education*, *55*(4), 1494–1503. doi:10.1016/j.compedu.2010.06.015
77. Yunkul, E. (2014). *Çoklu Ortam Tasarım İlkelerine Göre Hazırlanan Öğretim Yazılımının Başarı ve Tutuma Etkisi*. Balikesir University.
78. Zhu, C., & Chang, Z. (2012). Student satisfaction, performance, and knowledge construction in online collaborative learning. *Journal of Educational Technology & Society*, *15*(1), 127–136. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=aph&AN=72954727&site=eds-live\nhttp://www.new.ifets.info/index.php/ifets/article/view/18